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Agriculture and Economic Development on the European Frontier: Portugal, 1000-2000

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Abstract

This chapter follows the steps of renovation of European economic history towards a more unified interpretation of sources of growth and stagnation. To better understand the diversity of patterns of growth, we need to look beyond the study of the industrialization of the core economies, and explore the centuries before it occurred. Portuguese agriculture was hardly ever at the European productivity and technological forefront and the distance from it varied substantially across the second Millennium. Yet if we look at the periods of the Christian Reconquista, the recovery from the Black Death, the response to the globalization of the Renaissance, to the eighteenth century economic enlightenment, or to nineteenth century industrialization, we may conclude that agriculture in this country of the European periphery was often adaptive and dynamic. The fact that economic backwardness was not overcome by the end of the period is no longer the most relevant aspect of that story. Long-term agricultural transformation in Portugal replicates to a large extent what occurred elsewhere in Western Europe, as far as our knowledge of both developments through such a long time span can tell, both in terms of timing and intensity, albeit at a distance. European agrarian transformation was not too different on the southwestern frontier.

Keywords: Agriculture, Institutions, Long-term growth, Europe, Portugal

JEL Classification: N53, N54, O13, O43, Q10

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Agriculture and Economic Development on the European Frontier: Portugal, 1000-2000¹

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This chapter follows the steps of renovation of European economic history towards a more unified interpretation of sources of growth and stagnation. To better understand the diversity of patterns of growth, we need to look beyond the study of the industrialization of the core economies, and explore the centuries before it occurred. Portuguese agriculture was hardly ever at the European productivity and technological forefront and the distance from it varied substantially across the second Millennium. Yet if we look at the periods of the Christian *Reconquista*, the recovery from the Black Death, the response to the globalization of the Renaissance, to the eighteenth century economic enlightenment, or to nineteenth century industrialization, we may conclude that agriculture in this country of the European periphery was often adaptive and dynamic. The fact that economic backwardness was not overcome by the end of the period is no longer the most relevant aspect of that story. Long-term agricultural transformation in Portugal replicate to a large extent what occurred elsewhere in Western Europe, as far as our knowledge of both developments through such a long time span can tell, both in terms of timing and intensity, albeit at a distance. European agrarian transformation was not too different on the southwestern frontier.

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Introduction

Studies in economic history need to be fed with information on the evolution of aggregate output, labour, capital, land, natural resources, as well as on the institutional context, but the data is not always readily available, if at all, and increasingly less so as we go back in time. Yet, when the right questions are posed and an appropriate research focus is defined, such as the understanding of growth and cycles of convergence and divergence across regions or nations, economic historians have often proved to be quite able to build indicators of qualitative or quantitative substance. Moreover, the levels and rates of growth of income per capita or labour productivity can be inferred from the evolution of wages and prices for which there are some historical data.² Thanks to recent work, we are now able to provide a clearer picture of the evolution of the Portuguese agricultural sector across the second millennium, using qualitative as well as quantitative data. With that long run perspective we may go further in answering major questions about economic predicaments and advances in Portugal, and add this case to the broader discussion about the fundamentals of long-run development in Europe and maybe in other parts of the world. The aim of the present chapter is to present the new research on Portuguese agriculture and set it in the context of the wider debate on divergence and convergence within the European economy.

In order to study the evolution of the agricultural sector, we take into account the evolution of the institutional setting, including the changes that occurred in property rights and forms of landownership, the changing composition of agricultural output and demand for foodstuffs and agricultural inputs, looking for example at the introduction of new and more productive crops, some originated in the empire, the transformation of the patterns of domestic trade, as well as the evolution of methods of production and the technology employed, and the evolution of foreign trade. To complement these studies we also have new indicators for the evolution of output and labour productivity, for the period from 1500 to 1800, which can be linked to earlier estimates for the 19th and 20th centuries. Part of the information we are using here has been available for some time in a rather disperse and somehow unrelated forms, and it has been assembled here in a way that allows a better description of the evolution of Portugal's agrarian sector. A clearer picture of what happened to the agricultural sector of this country emerges as we put together qualitative and quantitative information and we do that for all epochs for which since the *Reconquista*.

² See, first of all, Allen (2000) and Hoffman (2000).

What can we learn from the enquiry into the agricultural sector of a peripheral and for most of the period here considered backward country of the European continent? How does such a study help explaining major themes in European economic history and economic growth at large? Were conditions for growth different in Portugal? Was it the case that opportunities for faster change were there but were not grasped because of institutional failure? What was the role of the central state, the government and public policies? Did the foundation and expansion of the overseas empire hinder or favour economic growth, or was it irrelevant for the evolution of agriculture at large? Did the Portuguese economy expand according to its growth potential or was there some degree of failure? What are the lessons for European economic history that we may derive from the study of long-run economic performance in this peripheral country? We hope that this study provides enough scope to discuss such a wide range of questions. Eventually, the answers are also in large numbers and varied and explanatory factors that may apply to one period of time or a region may not apply to other periods or regions. But we are better endowed now to understand economic growth in topics such as the importance of domestic and external factors in shaping economic transformation, the relevance of institutional consolidation, the contribution of natural endowments, demographic transitions and the evolution of human capital, the role of technology, markets, foreign trade, investment in infrastructures, and the role of the state in promoting or hindering growth.

By studying a period that goes well back in time, before the first industrial revolution and the industrialization of Europe, we can take into account other sources of growth besides technological change, in manufacturing and transport, or long-distance trade. In fact, we need to deal with a more complex reality where growth and its sources may be found in less spectacular ways, where changes in demand may be more relevant, where “proto-industrialization” or an “industrious revolution” may occur, where weather conditions may matter more, and where growth and stagnation are contemporary phenomena. These themes also show up in the modern period, although they have been disregarded for a long time in the economic historiography, but they are certainly more salient before 1800.

The British industrial revolution did in fact inaugurate a period of growth, as it unfettered economic activity from the limitations of humans and animals as sources of force and enhanced the use of technological innovation. Yet it may be that economic growth is more than societies moving through stages of development, from stagnation or immobility, through a revolutionary change, and towards sustained growth. Continuities are certainly more relevant than disruptions and stagnation and growth may occur contemporarily in different sectors in the economy. Thus, “we should move away from models of linearity and convergence toward a

mixed pattern of discontinuous growth and deceleration.” (de Vries 2001: 186). That perspective becomes quite clear when we look in depth to economic change across a long period of time. If we need a single model that explains the different phases of long-term development, instead of a “stages of growth” model, the study of the evolution of the agricultural sector in Portugal pretends to be a contribution on that direction.³ Our findings reinforce the conclusion that it was not necessary an industrial revolution or other type of breakthrough to step up from a neo-Malthusian environment of growth constrained by the pressure of population on resources, with no role for efficiency enhancements and technological change, to an environment of “modern economic growth” and structural change.

The chapter proceeds in two sections. In the next section we describe the main phases of growth of Portuguese agriculture since the 11th century, looking both at qualitative and quantitative evidence. We will discuss constraints and opportunities for agricultural growth in Portugal and sort out which have dominated in different periods. The second section sets the evolution of Portugal’s agriculture in the European context and discusses the overall causes of growth and fluctuations for the sector. We discuss here whether there is enough evidence to conclude for a “little divergence” in Europe, and whether growth can be better described by continuities, spread across time and space, or by short-term “revolutionary” discontinuities. The final section concludes.

Lessons from the European frontier

The evolution of the institutional setting that concerned Portugal’s agricultural sector shows continuities that clearly appear as more important than the discontinuities and that despite the fact that the country suffered a number of important institutional and political changes. Those changes range from its Muslim occupation to the Christian *Reconquista*, four royal dynasties, the dual Monarchy with Spain, a liberal revolution in the early 19th century and, in the 20th century, a number of military coups that put in place a Republic, then a dictatorship and finally a democratic regime. The institutional setting was closely linked to the natural conditions of the country but it was also adaptive and the conjugation of those two elements is probably the source of its strength. The evolution of the agricultural sector was also marked by the adoption of new crops in different parts of the country, some of them imported from overseas. The interruptions in the institutional setting and agricultural developments stem

³ See Rostow (1960), Kuznets (1966) and Landes (1969).

mostly from war and disease, but even in these cases, periods of death and destruction were followed by recovery and in some cases by change in the trend of developments. It is however hard to grasp the intensity of change and that can only be revealed by a structured discussion of the available evidence on output and productivity growth.

Malthusian growth

During the first century of the new millennium, Western Europe went through a period of economic change, marked by demographic growth, the opening of new lands to agriculture, the expansion of the number and size of the urban centres, and the augmentation of trade across the continent. These changes were accompanied by transformations in the methods of production used in agriculture, manufacturing and trade, as well as the spread of new financial instruments, particularly for long-distance trade.⁴ Portugal was no exception in this general European trend and in this country it was closely related with protracted and complex process of Christian conquest and settlement of territories which had been held by a succession of Muslim states for centuries (Henriques: Chapter 1 in this book). In 1031, the once mighty Caliphate of Córdoba, which by then occupied about 2/3 of the territory of the Iberian Peninsula, going from the Mediterranean to the Atlantic shores and from the Ebro to the Douro river valleys, collapsed, thus paving the way for the occupation of central and southern Iberia by expansionist northern polities. A few decades later, in 1064, the cities of Viseu, Lamego and Coimbra were conquered. Between 1143 and 1147, Portugal was founded and Lisbon was taken and made the capital of the new kingdom. In 1249, the new kingdom reached the southern region of the Algarve, nearly trebling its extension, to 90,000 km², in one century.

The conquered lands were at the periphery of the former Caliphate and were affected by more than two centuries of warfare which ended with the *Reconquista*. As such, they were scarcely populated and eventually in demographic and economic decline, punctuated with only a small number of urban centres. With the military occupation came a flow of migration from the more densely occupied northern regions and also migrants of Moorish, Galician, French, Flemish and German origins. Notwithstanding the southward movements, the northern and central regions also registered economic dynamism, which is clearly demonstrated by a cycle of creation of new urban settlements towns and the clearance of forests, marshes and heath lands. Military and administrative concerns led to establishment of urban centres in the

⁴ For a periodization of the evolution of medieval agriculture in Europe, see van Bath (1963), Duby (1972), Crouzet (2000: 160-166) and Malanima (2009: Chapter 3).

conquered peripheral lands, but proper cities were scarce and most urban centres remained “agro-towns” dominated by the landowning elites and with little connection and trade between them. This was a period of expansion, occupation, conquest of new lands, but that dynamism remained local as the population remained dependent on the land and long distance trade remained insignificant because the surplus was meagre and transport was difficult and expensive. Yet a consequence of the southern military expansion was the securing of the sea route linking the three major ports along the Portuguese coast, namely, Porto, Lisbon and Setúbal, and the increase in trade flows between the different parts of the new kingdom, making that route for the first time relevant in the context of the European sea trade.

The *Reconquista* can thus be depicted as the confrontation between two agrarian societies with contrasting levels of demographic pressure. The eventual victory of the more dynamic contender led to the overall intensification of occupation of the soil. The occupation of south Portugal brought significant changes in the distribution of land, the definition of land ownership, as well as patterns of population settlement. The system of property rights that had developed in the north of the kingdom was transposed to the southern territories, creating an institutional framework that, with little change, would last for a long time and would influence to a considerable extent the shape of Portugal’s agricultural sector. Even if the crown and the clergy presided over a large patrimony, the fact is that the number of freeholders remained important, as the new institutional framework facilitated the access to land ownership. The institutional setting also changed with the conquest, namely in terms of land ownership, the type of contracts between labourers and landlords, as well as higher levels of centralization of military and political power. Nevertheless, the replacement of one society by the other was accompanied by some elements of continuity, particularly in what concerns agricultural technology, as the Muslim legacy in this respect was considerable and well adapted to the natural conditions of the south. The old political structures were dissolved and replaced by the new institutions and the Muslim population had a significant change in its status. Yet some elements of continuity remained, particularly those embedded in technology and physical capital.

Thus, agriculture in Portugal had a relatively favourable period from before the millennium to the mid-14th century, when the new territory allowed for an extension of the agricultural occupation of land, an increase in population and at least a permanence of rates of return in terms of output per unit of land and labour, with an increase of the share of more productive crops, such as wine and olive oil, and with a considerable share of animal husbandry in total output. Yet considerable stretches of the southern territories remained to being cleared

or reclaimed and thus we may conclude that it was essentially a frontier economy with a relative abundance of land and other resources and relatively scarce population. The high ratio of land in relation to labour ratio contrasts markedly with the situation in other parts of early 14th century Europe, which appears more as a *monde plein* somehow struggling with an over-supply of labour.

Three and half centuries of territorial, demographic and agricultural expansion were interrupted in 1348 by the Black Death that reached Portugal at the peak of its dissemination throughout Western Europe, and killed in the first years between half and 1/3 of the population, which was reduced to about 700,000 inhabitants (Rodrigues: Chapter 2 in this book). The contraction of the work force happened in a context where the pressure of the population on natural resources was already relatively low which had a negative effect on the occupation of the land, and eased the pressure for transformation and thus was not globally advantageous. This situation contrasts notably with what was happening in other parts of Europe where the availability of land per unit of labour was lower. The negative scenario of lower number of workers per unit of land was somehow compensated by the fact that livestock most probably increased, as land for pasturage became more available. The decline in population also led to a rise of wages in relation to rents, thus affecting positively the income of wage earners, but negatively that of landlords, leading to the abandonment of a number of estates, particularly in the areas with lower levels of land productivity. There was also some land redistribution, as manors and free holdings that belonged to proprietors that were killed by the plague were handed over by the king to the Church.

These changes prompted new laws and reforms to protect lay and monastic lords. In 1349, an ordinance compelled landless men and vagrants to work for land owners and established limits on wages. In 1375, another ordinance, the *Sesmarias Law*, introduced regulations on prices of working animals, and compelled landowners to keep the holdings cultivated in order to avoid being seized by the King. As a consequence, a number of landlords had to abandon direct farming of their demesnes and leased their properties, in some cases granting better conditions to their tenants. During the last third of the 14th century, the economic crisis was severely prolonged by a succession of dynastic wars with Castile and the resurgence of outbursts of the plague. Yet by the end of the century as the military, political and demographic situation improved, the country joined a new period of economic stability, and that in an institutional context with relevant changes. The economic implications of the plague were of varied form, but the society proved resilient and adaptive and that is probably one of the most relevant lessons from this period of hardship and yet also of recovery.

New horizons

Slow but persistent economic recovery from the late 14th century onwards served as the background for the ensuing epoch of the overseas conquest and exploration, which commenced with the conquest of Ceuta, in northern Africa, in 1415. This first expedition ended up being very costly both in human and financial terms, but the following expeditions would prove highly profitable. The century saw the continued overseas expansion and the conquest of trade posts, increasing trade along the coasts of north and northwest Africa, and the agricultural and commercial exploration of the Atlantic islands of Azores and Madeira. But the emerging empire had little impact on Portugal's agrarian sector and would become relevant only in the following centuries. The new era however led to expansion of international trade and to its increasing relevance to the Portuguese economy. These changes ultimately gave new opportunities and challenges to the agricultural sector, in the centuries to come, not only because it led to the introducing of new agricultural products, such as maize, but also because it led to the acquisition of colonies and the signing of international alliances that favoured external trade (Miranda: Chapter 3 in this book).

Agriculture in Portugal continued to improve during this period, both of the extension of land put in use and possibly in terms of output, as well as domestic trade. By the end of the 15th century, the level of the population existent before the outbreak of the Black Death was attained once more and eventually superseded. Such recovery accompanied the overall European recovery, or "Europe's second logistic" (Neal and Cameron 2016), which lasted down to the mid-17th century. These changes may also be detected at other levels apart from demography and the extension of land occupation. In fact, farmers increasingly turned to agrarian activities with higher levels of productivity, such as animal husbandry, which increased during the period, and the production of wine and olive oil, implying an alteration in the structure of output, albeit probably marginal and not "revolutionary" and to increases in labour productivity. Trade with Europe also expanded, with grain imports becoming increasingly more important, and exports of staples such as cork, sugar-cane from Madeira, and dyestuffs increased in moderate terms. Wheat from northern Africa and the Azores was imported mainly into Lisbon but only in limited quantities.

Following a century of recovery from the Black Death, positive agrarian developments and overseas expansion, most of the 16th century was one of slow if any transformation. Portuguese agriculture continued in its trend of change and adaptation, yet with a lower level of intensity as compared to what was happening in the northern European regions. Trade across

the Atlantic Ocean expanded fast, complementing the growth of trade in the axis that crossed England, France, the Low Countries, and Northern Italy. Population and the labour force continued the path of growth that had commenced in the previous century which put pressure on natural resources and the supply of agricultural products. As an immediate consequence prices and rents increased and ultimately new land was put into use, reaching terrains which were left vacant after the Black Death and leading to the clearance of woods and forests, the diminution of pasturage, and the drainage of marshlands (Neto: Chapter 4 in this book). These changes occurred in a complex institutional setting which was far from stagnant. The variety of types of landownership was considerable and some of the forms were “imperfect”, and landowners were separated in different classes with different sets of rights, including the crown and the nobility, the church and the religious orders.⁵ Property rights were paramount for the way the land was put under use but there were also many instances of adaptation. In fact, short-term leases could be successively prolonged. The institutional setting ultimately adapted to different natural conditions and historical heritages and changes in demand for agricultural produce and variations in the pressure on the resources. The observed institutional flexibility implied that it was probably not a barrier to changes in the sector, although it probably was neither a source for economic transformation.

Historians have for a long time detected signs of expansion of the agricultural output for most of the 16th century and of changes in its composition towards products with higher land and probably labour productivity, such as wine and corn, as well as animal husbandry, and which catered increasingly to the markets. Trade within the country increased as cities expanded in size and routes were safer and seaborne exports to northern European exports of the expanding agricultural sectors also increased. The evidence regarding these trends is scarce and sometimes rather indirect, so it is difficult still to put figures and particularly to identify major fluctuations. The new quantitative evidence points to the conclusion that there was a severe downturn in output in the first decades of the period followed by recovery to about 1560 and a flat trend down to the middle of the following century. During this period, the divergence of levels of agricultural productivity between the northern and southern regions of Europe began to develop (Allen 2000). The territory remained far from fully exploited in the 16th century. According to Magalhães (1970: 233-43) the stretch of territory of western Alentejo down to the north of the Algarve had no urban centres and was virtually deserted, which implied that the

⁵ See Santos (2006).

commercial links of the southern coast were stronger with Andalusia than with the rest of Portugal. That scenario would change only much later on.

The 17th century was marked by uneven patterns of European development, as the expansion of agriculture in the North contrasted with slower growth or depression in the Mediterranean region, and it was probably the first century of divergence of national productivity levels across the Continent. The analysis of developments in Portugal confirms that, as may be shown by looking at the available information on agricultural production, markets, as well as institutional and social developments. The information regarding agricultural output is based on the analysis of tax collections, namely the *dízimo*, as well as prices, wages and rents. Agricultural rents fell in the first three quarters of the 17th century and increased following the end of the Restoration wars with Castile (1640-1668), which affected agricultural and livestock output and greatly disrupted markets. The areas most affected were the territories of Beira Interior and Alentejo, closer to the Spanish border and particularly hit by the war. Moreover, these regions did not benefit from agricultural conversion associated with the diffusion of maize which happened in the rest of the country, including, possibly, also in the southern province of the Algarve. With the end of the war agriculture recovered throughout the country. Agriculture was marked by the predomination of grains, particularly barley and wheat, but also maize which was having a large diffusion, and a considerably smaller part for olive oil, wine, fruits and vegetables, as well as livestock. Fisheries and salt extraction were important complementary activities in the coastal areas, particularly to the north of Lisbon and in the southern province of the Algarve. Trade was limited in scope either domestically and internationally, with few exceptions around urban areas, where some trade of agricultural products and manufactures occurred. This was in clear contrast with other parts of northern Europe, where grain production was proportionally smaller, livestock and dairy had a large relevance, as did trade.

Throughout the 17th century agriculture remained the main source of revenue for a complex set of taxes, collected by landlords, religious institutions, local authorities (*concelhos*) and the central state. Yet the competition for tax income between the central state and the regional powers led the landlords to increase the control over their estates. Similarly, tax revenues from the colonial trade in the Eastern empire fell and it took some time before the rise of revenues from gold and diamond mining in Brazil surged, what happened from the last two decades of the century onwards. Such changes occurred in a context of the increase in taxation due to the wars of the *Restauração*, after independence from Spain was re-established. The wars and a number of crop failures led to a contraction in agricultural output and to an increase

in the number and intensity of famines. Population also fell or increased only very slowly and that contributed to the abandonment of many cultivated lands. On the positive side, the introduction and the expansion of new plant varieties continued, which provided a stimulus for output and productivity growth. There was a progression in the plantation of vines and olive groves in the northern regions, as well as the expansion of the cultivation of maize, which was no longer confined to the centre and north-western regions and progressed to centre and inland territories. These trends were consolidated in the following centuries.

Over the course of the 18th century, transformation in the agricultural sector continued and the most significant element of that was the increase in the level of commercialization of the output, as farmers catered with an increasing intensity to the domestic market and, to a lesser extent, to foreign markets. According to an estimate, by 1770, two thirds of output produced in the Lisbon region was sold in the market and this is indicative of the changes, even though it was probably lower in the rest of the country, as Lisbon was the largest and a fast growing city (Serrão: Chapter 5 in this book). In 1703, Portugal signed a commercial treaty with which granted protection for wine exports to England, mainly from the Douro valley, in exchange for protection for British woollens in Portugal. Agriculture thus responded to changes in the economic environment, which were considerably widespread according to the many sources of qualitative and quantitative information we have about the period. Those changes were in line with what happened in the previous centuries in periods that were not affected by plagues or wars, but it occurred with a higher level of intensity.

The changes in the international setting, particularly in Western Europe, and the abundance of gold imported from Brazil were major drivers of economic dynamism, but the ability of the agricultural sector to expand, invest and introduce and divulge new methods and crops is also part of that story. Such transformations were achieved under high output growth volatility. In fact, agricultural output reached a peak in the mid-18th century, and that upward trend was followed by a sharp downturn to the end of the century which, however, did not cancel all previous gains. Thus, the increase in the population, the expansion of cities and other urban settlements all over the country, new export markets and on top of all that the gold from Brazil, leading to an increase in wealth, enrichment of the elites, provided an economic environment that fostered investment and consumption in the agricultural sector.

Although the market stimuli actually combined a mix of opportunities and risks, it is possible to say that Portuguese agriculture, despite some variations by regions and by sectors, succeeded fairly well in adapting to the new conditions (Santos 2006). The farm sector became more market-oriented and market-integrated. Less profitable crops were discarded and replaced

by a specialization in those agricultural products that presented the best comparative advantages, both in the domestic and in the international context. Along with these changes, farming also experienced some innovation and became a more attractive investment. Thus, Portuguese agriculture experienced a ‘silent revolution’ over the course of the 18th century, enriching and reconfiguring the rural landscape and agricultural output, driving the expansion of cultivated land, encouraging the adoption of new technologies and investments, and improving the articulation with other economic sectors. As a final outcome, Portugal became self-sufficient in fruit, olive oil, vegetables, meat, wool and wine, and a major exporter of some of these products in the European context. Furthermore, agriculture was able to supply the majority of the raw materials needed in the domestic wool, silk and hemp industries.

The overall conclusion regarding the performance of the agricultural sector in Portugal in the three centuries to the end of the *Ancien Régime* is that it went through a slow but persistent transformation in many aspects, from the institutional setting, to the structure of output, the expansion of the area under cultivation, the introduction of new crops and methods of production, and the increase in the share of the output that was commercialized and exported. The institutional setting and the structure of property rights did not suffer major changes demonstrating that it was compatible with agrarian change and not an impediment, as it has been already concluded for previous centuries.

The agricultural landscape was thus substantially transformed in terms of the extension of the area cultivated, the organization of the fields, eventually the type of products cultivated, particularly around the expanding urban centres. These changes impacted on the welfare of both peasants and urban dwellers, and both landowners and labourers. These transformations were interrupted by the emergence of wars, particularly in the 17th century, but as conflicts ended the dynamic of change resumed.

An evaluation of the evolution of output growth since the Middle Ages is now possible, based on newly assembled indices for agricultural wages, income and prices. The new indices show that in the period from around 1500 to 1850, total output doubled in real terms, implying an average annual growth rate of 0.2 percent (Reis: Chapter 6 in this book). That upward trend was marked by swings of growth, stagnation and depression of different time lengths. The 16th century started with a sharp output contraction, from 1500 to 1520, followed by recovery and in 1560 the previous peak was already recovered. From then on a century of relative stagnation ensued, ending in 1660. In the following hundred years, to 1750, output increased by 50 percent, and a period of stagnation followed, ending only in the first decade of the 19th century, and output increase again by 30 percent again between 1800 and 1850. The most striking aspect of

these estimates is the fact that agricultural output measured in constant prices suffered sharp downturns and outbursts. Clearly the pre-industrial agricultural sector was prone to the vagaries of climate and plant diseases and that may have contributed to such variations. Yet the fact is that no major famines were registered across these three and half centuries, except during the wars with Spain, and also that population increased steadily throughout this long period. Population growth put pressure on agricultural land which however increased, as new fields were occupied, forests cleared and swamps dried. These results question the presence of Malthusian forces in determining the long-term evolution of Portuguese per capita agricultural output in the pre-industrial period, as output declined also in periods of population growth, and we need thus to determine what were the main driving forces behind growth and fluctuations in output, which were the main constraints of growth, whether domestic or international, and whether related to the structure of natural resources or to the social capability of farmers and policy agents.⁶

Growth, structural change and demise

During the 19th century Portuguese agriculture progressed further and suffered a few fundamental transformations, as output expanded, its composition changed, and labour and capital productivity increased. By the end of the century, the use of artificial fertilizers and mechanization, as the transport to cities by railways, began to rise, particularly in the large cereal production estates of the south. The transformation of 19th century agriculture in Portugal was also supported by institutional changes that favoured an increase in the commercialization of the land and the occupation of new soils (Branco and Silva: Chapter 7 in this book). Most of the transformations followed the pattern that has been detected since the earlier periods, although there was some intensification. Growth was to some extent dependent on the expansion of the cultivated area. The overall context remained relatively backward in regard to the more advance economies in northern Europe and even to some regions in neighbouring Spain. Two major features of the lag in the transformation in the sector is the fact that the *levels* of labour and land productivity of most crops remained among the lowest in all of Europe, and the share of animal products in total agricultural output was also well beyond that of most other countries, which hampered most of all the fertilization of soils.⁷ These factors are of course closely related.

⁶ See Simpson (1995: 16-20) and Fonseca and Reis (2011).

⁷ See Bairoch (1989), van Zanden (1991), O'Brien and Prados (1992) and Simpson (1995).

For most of the country the rural landscape was poor and disconnected from the advances in the industrial and urban areas. The detachment between these two worlds of the economic activity also implied that agriculture did not receive a sufficient amount of capital from other economic sectors, and sold few products for industrial transformation, thus contrasting with what happened in the more advanced areas of Europe (Federico 2005). Importantly, virtually all the raw cork produced in the country was sent to be transformed in industrial units abroad, and agricultural products of better quality, such as wood for urban construction, had to be largely imported. Agricultural developments are of course highly dependent from what happens in the rest of the domestic economy and the international environment and the fact that Portugal entered a period of industrialization, however late, and that the international economy was expanding fast meant an overall positive context for agriculture.⁸

Clearly there was a growing perception of the long bridge Portuguese agriculture had to cross in order to reach the level of advance in other parts of Europe and many efforts were in fact conducted by the state and by farmers, including large and small landowners. Yet the degree of backwardness was too large to be surpassed in just half a century. The advances that were felt in the sector also meant that the level of labour and presumably capital productivity was not too far away from the level in some manufacturing sectors which to some extent hindered further shift of resources from agriculture to industry. By the end of the 19th century, wheat protectionism reversed structural transformation of agriculture, as output expanded and more labour and capital was employed in the sector. In fact, total labour force in agriculture did not decline and continued to increase in the next three decades. Yet we may conclude that globally the agricultural sector did not hinder economic growth in 19th century Portugal and that it had changes that were of great relevance for the years to come into the next century.⁹

The impact of World War I was mostly of a financial and monetary character, as well as demographic, but economic activity quickly resumed after the end of the conflict, following the pattern elsewhere in Western Europe at least down to the Great Depression. Due to the disequilibria in the public and external deficits, protectionism was reinforced and the level of state intervention also increased significantly and agricultural output increased in response.

⁸ See Lains (2009) and Pinilla and Ayuda (2009).

⁹ See for a contrasting view, for example, Neal and Cameron (2016). In the international literature on this topic backwardness is often too hastily associated with absence of change, which indeed occurred although far from fast as fast as wide in more advanced countries such as Sweden. See Myrdal and Morell (2011).

That expansion led to a small increase in the share of the labour force occupied in the sector and was not followed by major changes in the levels of labour and capital productivity. Yet public and private investment in agriculture increased, as the use of fertilizers, machinery and irrigation increased. Despite the war, the first decades of the twentieth century were relatively favourable for the Portuguese agricultural sector.

During the period from 1929 to 2000, Portugal's agricultural sector experienced three distinct phases, which were somehow marked by changes in the attention it received from national governments and, later on, from the European Union (Amaral and Freire: Chapter 8 in this book). From the beginning of the period here covered up to the early 1960s, tariff protectionism, domestic prices controls and public investment led to the continuation of a period of output and employment growth in the sector.¹⁰ That trend was reversed in the 1960s, when industrialization gained momentum and private and public resources were diverted to manufacturing and the shares of agriculture lost ground for the first time in this century. In this period, the rural areas lost population to emigration to the cities and abroad in a massive scale. These transformations were certainly inevitable due to the dimension of industrialization, as manufacturing expanded at very fast rates. Agriculture changed considerably in many aspects, including an increase intensive exploitation of natural resources; the intensification of the use of fertilizers, automation, irrigation; the use of research in animal species and plant varieties.

The transformation of the sector was only helped to a relatively low extent by state intervention, particularly during the heyday of fast industrialization, contrarily to what happened in the of western Europe, where industrialization was also fast, but where governments generally introduced policies to promote investment in the sector and compensate the incomes of the farmers. Portugal's accession to the European Communities and the Common Agricultural Policy, in 1986, brought relevant changes as the remaining domestic protectionist policies were lifted, which was particularly important in what trade with Spain was concerned. From its start, the Common Agricultural Policy aimed at increasing the profitability of the sector, by controlling prices of output. Yet as surpluses piled up the policies were changed and farmers' revenues were instead directly subsidized, regardless of output and productivity levels. These policies largely contributed to a balanced demise of the sector, as its weight in total labour force and total domestic output converged to the western European average. That decline was however accompanied in a first moment by a relatively small convergence of factor productivity levels, except for a few sectors that benefited either from

¹⁰ See Bairoch (1989).

infrastructure investment or from shifts in consumer preferences. All in all, the agricultural sector ended up being relevant for the preservation of better conditions in the rural areas and a more balanced distribution of population and income across the country, thus contributing very little directly to the growth of output, investment and trade.

Convergence in European agriculture

The picture we have been able to draw regarding the long term evolution of the Portuguese agricultural sector can now be inserted in the general study of trends and fluctuations of European agriculture, but with great care as the information is rather scant and with many grey areas. We have achieved some degree of comparability but in a context where quantitative data based mostly on indirect indicators of only parts of the sector, in terms of output and regional coverage, needs to be interpreted together with qualitative information on how the sector evolved in Europe. This is truly a large and complex sector in a large and complex territorial entity study across a period where many changes occurred. Despite these limitations, we still can reach some relevant conclusions regarding two crucial aspects. The first is to understand whether agriculture in Portugal followed trends mostly determined by domestic or external factors, whether the cycles in this country were or not common to those of the rest of Europe. The second aspect that the present study can highlight is about the discussion of whether long-term European growth fits better a *Rostowian* typology of stages of growth, with bounds and leaps of ingenuity and productivity, or rather by a more continuous evolution, where productivity advancements take long to spread and consolidate across sectors and the domestic and the international economies.

Patterns of growth

The study of the development of Portugal's agrarian sector that we carried here is necessarily a relevant contribution to the study of European agriculture and economy, particularly in what concerns its diversity and its relations with the outside world. Europe is diverse continent either because of geography and natural resources, or because of human occupation, and it is a continent inserted in a global context, with connections across Asia, the Mediterranean and the Baltic seas, or the Atlantic Ocean. Such diversity can only be understood if we study with some detail its different components, including the regions on its periphery. Being in one of its frontiers, the study of Portuguese agriculture ends up being also a good field to understand the conditions under which economic activity took place in regions with, on the

one hand, poorer soils and lower levels of rainfall and, on the other hand, more closely connected to the Mediterranean, the Northern African and the Atlantic worlds. The diversity of European ecosystem implies the diversity in methods and structures of the economic activity, particularly in what agriculture is concerned.¹¹ But we may also identify to a certain extent an European “agricultural system” or “European-style agriculture”, in opposition to other systems in Asia, Africa or the Americas (Myrdal 2011: 265-264). Portugal is part of it and our closer look of the sector from the early Middle Ages to the present time certainly corroborates that general conclusion.

The diversity of the European economy is also reflected in its relationships with the rest of the world (Crouzet 2000: 11-18). Portugal, since its early days as a state, was open to the outside world despite natural barriers of different sorts. The northern regions of the country were inserted in an area of relatively dense population, but the western and southern frontiers faced for a long period of time areas of the world with little economic activity, either because of the difficulties of seaborne navigation or because of the poverty of the soils and scarcity of rainfall to the south. But the potential that there was for trade and commerce was eventually exploited with military and demographic occupation of the south of the country. The maritime expansion from the earlier 15th century on made Portugal a “sea State” on the cross lines between the Mediterranean and the Atlantic trade (Darwin 2008: 51-52, 96-97). The importance of the empire and of external trade would however remain small for Portugal’s agriculture well into the late modern or contemporary periods. The relevance of external relations will however be felt in a number of structural features that directly or indirectly affected the sector. One such feature was the adoption of cultures imported from the Americas or other parts of the world, such as potatoes, maize and rice (and sugar and tea in the Atlantic islands of Madeira and the Azores). One other was the fact that the empire provided a source of state revenue which rendered state finances less dependent on taxing land, labour and domestic trade. Lastly and certainly less importantly, the empire also had demographic impacts which affected the supply of agrarian labour. From the eighteenth onwards external relations slowly became more relevant to the agrarian sector, following similar trends elsewhere in Europe, as economic integration within the continent gained momentum, thus reaching its geographical peripheries.

As it happens with the case of Portugal, the evaluation of the long term development of the European economy is very scant and it is necessary to look into many different directions in order to assess the main trends and fluctuations for population, output, and inland or overseas

¹¹ See Lains and Pinilla (2009).

trade. We need thus to resort to conjectures in order to have a broad picture of the main developments. One such conjecture based on many different sources of evidence point to resurgent economic activity in the beginning of the second millennium up to the Black Death in the late 14th century. Our periodization for the Portuguese agrarian economy coincides with that perspective. Yet trends in the evolution of the agricultural sector in Portugal mirror to a large extent what happened in other countries in Europe and maybe also a general trend for Europe. According to Malanima (2009: 156-157). European agriculture had three large waves in the second millennium, namely, from about 900 to 1300, a period of “slow progress” when “no true revolution took place, but there were modes, short-lived progress both in energy supply and agrarian technology”, and climatic conditions were favourable; a “second age” from the 14th century to the beginning of the 19th century, with a “stationary or declining trend in Europe in general despite the success of both English and Dutch agriculture, especially in the 17th century”; and a “third age” of modern growth after 1820.

The changes that we have described here occurred elsewhere and in many parts, particularly in the northern regions of Europe, changes were deeper and occurred at higher speed. This was a process of overall transformation of European agriculture of which Portuguese farmers were part, but probably still lagging behind the forerunners in many respects. The fact that there were important transformations in the Portuguese agricultural sector does not imply that backwardness was fully overcome as change occurred elsewhere and in some cases at faster rates of growth. According to Crouzet (2000: 160 and 166) European agriculture suffered from two long depressions since the Middle Ages due to the composite or separated effect of demographic stagnation and climate changes, but since the 18th century it followed mostly an upward trend.

Table 9.1 summarizes the available estimates for the evolution of agricultural output in Portugal and four other countries, since the 14th or the 16th century. Table 9.2 reproduces the estimates for the evolution of agricultural output, population and output per capita from Allen (2000) for nine countries to which we have added data for Portugal and an estimate for “Europe”, which was computed as a simple average of growth rates of the countries represented in the table. The comparison of the data in the two tables for England, Holland, Italy and Spain provides a measure of the error of these exercises in computing long-term growth and we may conclude that there are relevant differences but within acceptable margins of error. For England, for example, the estimates by Broadberry et al. (2015) for the growth of arable product in Table 9.1 are quite similar to those by Allen (2000) in Table 9.2, regarding the periods 1300-1400 (-0.60 vs. -0.58 percent), 1600-1700 (0.29 vs. 0.37 percent) and 1700-1800 (0.41 vs. 0.33

percent), but not for 1400-1500 (-0.37 vs. 0.08 percent) and 1500-1600 (0.44 vs. 0.20 percent). For Holland, the data in Table 9.1 point to a decline in output in 1620-1665 and 1665-1720 (-0.02 and -0.11 percent), whereas the data in Table 9.2 point to a positive trend during the period from 1600-1700 (0.23 percent), but during the 18th century the difference between the two sets of estimates is considerably reduced (0.28 vs. 0.25 percent). Estimates for Italy show a flat or slightly negative trend for the whole period covered, from 1360 to 1800 in both tables, and the differences for Spain are more relevant for the 18th century, as Allen (2000) estimates a decline for 1700-1750 and growth for 1750-1800, whereas Álvarez et al. (2016) estimate growth in the first period and a flat trend in the second. This exercise shows that we need to take with some care the evaluation of output growth but also that some general conclusions can be made.

[Tables 9.1 and 9.2]

The overall trends that we can depict from Table 9.2 is that agricultural output growth was overall positive in the 15th century and that it recovered from the 14th century depression, at least in the two cases for which data is shown, namely, England and Italy. During the 16th century the rate of growth turned into negative in six out of the nine countries, following probably the damages of warfare. Then growth resurged in the countries more affected by the previous regression, with the notable exception of Italy. Finally, the 18th century was globally a period of growth and in many cases at rates above those from the previous periods, again with the exception of Italy. The average for Europe depicts in a clear way the trends just identified. Portugal stands out in this table in three aspects. Firstly, output did not decline in the 16th century although it evolved along a flat trend; secondly, the 17th century shows a negative trend, following Italy and unlike the rest of the countries represented; and thirdly the fact that the 18th century had to very distinct phases unlike most of the rest of Europe, as output expanded fast until 1750 and contracted afterwards.

Table 9.2 also shows population growth and the growth of output per capita. As to population, the overall trend for Europe is clearly positive, with very few occurrences of negative rates of growth. Moreover, the increase in the intensity of growth of output from the 17th to the 18th century was accompanied by an increase in the intensity of growth of population. If we take the average for Europe in the last column of the table, we may see that during the 17th and the 18th centuries, the rate of growth of output increased alongside with that of population (from 0.11 to 0.30 percent and from 0.13 to 0.38 percent). Probably the most striking conclusion from the same table is that there is a generalization of negative growth rates, which is clearly reflected in the average rates for Europe, in the last column of the table. After 1500, there is a predominance of negative growth rates in southern countries, such as Italy, Spain and

Portugal, but we may also find decline in output per capita in Belgium, throughout most of the period, as well as Germany, from 1500 to 1700, and Austria and France. Thus, the data does not show a “little divergence” between northern and southern Europe, and the dividing lines are more chronological than geographical. Álvarez et al. (2016) conclude for such a divergence but only between Holland and England and Spain and Italy. During the second half of the 18th century, growth rates were negative in all countries except Germany and Poland. According to Allen (2000: 20-21), the source of the data for Table 9.2, except for Portugal, agricultural output per worker or productivity followed the same negative trend in all countries but England and the Netherlands, the only two “success stories” of European agriculture, during the 17th and 18th centuries (see also Álvarez et al. 2016).

Thus, the analysis of this data should be taken with great care. The efforts to measure growth in the long-run have just started and although there were considerable advances in the last years, there is still a lot of uncertainty about the main trends of growth and decline. The fact that we are at the start of a new wave of data also implies that we have to be careful in developing theoretical models for causes of growth or decline, as very few information exists about trends of productivity of factors and no information at all on capital and investment. Moreover, it should be taken into account that the dynamics of growth may have changed before and after the industrial revolution as, for instance, it happens with the fact that pre-modern structural transformation is less associated to growth then during the heyday of industrialization. This is so probably because before 1800 structural change could be more strongly associated with changes in demand rather than with technological change and the supply side.

Looking now at the contemporary period, as shown in Table 9.3, from 1870-1913, agricultural output increased at 1.2 per cent per year, which was slightly above the European average growth rates for the same period. Contrarily, the interwar output depression was felt less intensely in Portugal, as compared to most countries shown in the same table. From 1920 to 1938 output expanded at 3.8 per cent per year, which places the sector among the fastest growing in Europe.¹² Growth of output proceeded to the end of the 20th century but labour also increased down to 1960 and thus its productivity expanded at slower pace. Labour productivity in agriculture expanded fast between 1960 and 1990, at 4.4 percent per year, which was due to the substitution of capital for labour and the increase in total factor productivity.¹³ A comparison

¹² See also Federico (2005: Chapter 3).

¹³ See Branco and Silva (Chapter 7 in this book) and Lains (2009: 336-340).

with output and productivity trends in Portugal, between 1865 and 1951, and Spain, France and Denmark lead to the main conclusion that the performance of the sector was relatively positive.¹⁴ Yet Portuguese agricultural sector had to cope with the increase in agricultural labour force, contrary to what happened in the other countries. Also, land under use in agriculture was still growing in the second half of the 19th century, contrarily to the other countries in the table. After 1902, agricultural land either increased at a lower rate or decrease but, as the labour force kept increasing, the land-labour ratio declined, which happened only in Spain in a period that comprises the 1936-1939 Spanish Civil War.

[Table 9.3]

Historical analysis that stretches across a millennium necessarily has a large degree of uncertainty. This is particularly true for studies that depend in a crucial way on the evaluation of quantity trends, such as the assessment of levels and trends of output, labour, land and capital productivity, as well as the impact of changes in methods of production and technology. The analysis of the evolution of agrarian history as we carry in this study asks questions that medieval, modern and even contemporary sources are not fully prepared to answer, as the concepts of growth or convergence derive from theoretical frameworks which have developed only in recent decades. Historical sources, however, can be pushed a bit further than they have been traditionally, particularly in what concerns variables which also got attention in the past, such as population, prices, wages, foreign trade, and public revenue and debt. Although the available data does not provide the full picture, the new set of questions may on growth and convergence certainly leads to a new perspective on agrarian developments. But we need to take into account that the achievements in this regard are quite unbalanced in terms of the different historical periods since the early Middle Ages and also in terms of different European regions, nations or states.

Uncertainty regarding quantity trends can somehow be complemented by looking into institutional developments which have been largely explored in the historiography. These include first of all the analysis of transformations in the political landscape at the national level, which is particularly relevant as the period we studied here involved territorial conquest and occupation and state formation. Thus, inferences about agrarian developments also depend on the analysis of the new political setting, as well as on institutional developments regarding war and peace, the rule of law, property rights, labour contracts and taxation. The study of institutional factors is crucial to evaluate the context in which economic activity takes place.

¹⁴ For agricultural productivity trends in Europe during 1870-1913, see also van Zanden (1991).

That is necessarily done by inference as the evidence is indirect. As such, for example, the occurrence of regular armed conflicts is hardly compatible with economic prosperity, whereas changes in labour contracts can be associated with changes in labour demand or supply, as new territorial concessions may be linked to the expansion of agricultural land. Possibly the most relevant contribution of institutions analysis to the present context is the dynamic perspective it necessarily introduces. The picture we provide here has thus many frailties and it cannot be otherwise, due to the extent of the period and the lack of data. But it is on the other hand an enlightening exercise as it involves putting together information that lies on the background of many historical studies, sometimes in an incoherent or inconclusive fashion.

The brighter side of the present study is based on three grounds. Firstly, since earlier periods of time, historians and economic historians have been concerned with the need to measure economic performance, and that is translated into a considerable number of studies on specific parts of the economic activity. It is important to stress that the availability of such studies does not necessarily increase over time, as the earlier medieval period is in certain aspects better covered than the late medieval or the modern eras, and there is quantitative information for the late 18th century which is not available for the earlier 19th century. Secondly, there have been great advances in the elaboration of indices for macroeconomic variables, based on direct historical quantitative evidence, and which can be linked to data for the contemporary period, based on direct estimates or national accounts. Thirdly, the study of institutional aspects of Portugal's history is well connected across themes and epochs and that implies that it is possible to follow closely the path of the institutions that presumably matter the most for the analysis of the agrarian sector. To a certain extent, the exercise carried here undercovers the trends and fluctuations of agrarian output and factor productivity hidden in the relevant historiographical works. The outcome has of course many setbacks but the fact of the matter is that we hope to show that it was possible to step up a degree in our knowledge about agrarian performance, as well as in the set of questions that need to be answered.

Sources of growth

In the beginning of the period here studied, Portugal was clearly a frontier economy, as land was abundant in relation to labour, thus providing the necessary conditions for increases in output and population.¹⁵ But the advantage of the country in relation to the rest of Western

¹⁵ For the discussion of levels of per capita income in the long-run, see Campbell (2013), Palma and Reis (2014), Broadberry et al. (2015: 422-428) and Fouquet and Broadberry (2015).

Europe would eventually disappear in the aftermath of the demographic shock imposed by the Black Death, as growth became more dependent on improving methods of production and technological advances. Slowly the sector responded to the changes in the overall conditions, taking advantage of the expansion of the domestic and to a much smaller extension, international markets. By the end of the 18th century, the scenario for Portugal's agricultural sector had changed considerably as it was then "a densely populated country with a population and a low land-labour ratio which continued to grow at a fast pace".¹⁶ From then on, agricultural change depended to a larger extent on structural transformations and less on the extension of demand conditions.

European agricultural growth before 1800 had a globally positive trend of growth although certainly slow and with quite sharp fluctuations.¹⁷ Growth was not constrained by a Malthusian trap as it was mostly accompanied by population growth. There was however a number of cases where agriculture apparently suffered from long depressions, as it happened in Italy after 1500 but it does not support "the pessimistic view of the European pre-modern economy" (Malanima 2010: 190). Spain followed closely the Italian trend but for different sets of reasons. Yet according to Cipolla (1981: 250), "the decline of Spain in the 17th century is not difficult to understand. The fundamental fact is that Spain never developed to begin with." As Portugal, Spain can be described as a "frontier economy", as output per worker and labour force evolved in parallel in the long-run, due to the availability of extra land to be put into use.¹⁸

On the other hand Holland was the fastest growing economy. More importantly, Holland and the Netherlands, according to van Zanden and van Leeuwen (2012: 128) show that the rate of growth of output in the pre-1800 period hides the intensity of structural change of labour and output. In fact, Holland was the "first modern economy". That implies, according to de Vries and van der Woude (1997: 693), that product and factor markets were "free and pervasive", agricultural productivity was "adequate to support a complex social and occupational structure that makes possible a far-reaching division of labour", the state was "attentive to property rights, to freedom of movement and contract" and not "indifferent to the material conditions of life of most inhabitants", and the level of technology was "capable of sustained development and of supporting a material culture of sufficient variety to sustain market-oriented consumer behaviour". But Holland also had the first "modern decline", in the century from the 1660s to the dawn of the British industrial revolution. Yet if we take

¹⁶ Reis and Henriques (2016: 16). See also Henriques (Chapter 1 in this book and 2015).

¹⁷ See van Zanden and van Leeuwen (2012) and Fouquet and Broadberry (2015).

¹⁸ See Álvarez et al. (2016: 5 and 28). See also Álvarez and Prados (2013).

population trends as an indicator of macroeconomic development it can be concluded that in the Netherlands, contrarily to most of the rest of Europe, demographic change was no longer dependent on the supply of land and food or mortality crises, and instead “the relevant factors became: jobs, urbanization, migration, marriage age and modern expectations.” The “modern decline” was not about of a technological or supply backlash, but rather “it was a demand-delayed transition from a first to a second cycle of modern economic growth”, due to the clash of empires in the international markets.¹⁹

During the 18th century, the transformation of agriculture was fastest in Britain than in the rest of the continent, but the main distinction was of degree and not so much of the kind of transformation. Simpson (2004) surveys the transformations in British and a number of other European countries’ farming during the 17th and 18th centuries, namely, in terms of livestock specialization, increase in labour intensive-farming and changes in the use of land, to find that the main distinction was in the higher ability of British farmers to invest, due to the larger size of British farms.²⁰ Countries that lay closer to the technological and productivity frontier, such as the Netherlands, first, and Britain, afterwards, were simply better endowed in terms of every kind of resources. Thus, the patterns of development in pre-industrial Europe ranged considerably from cases such as Spain and the Netherlands and England and this can certainly not be grasped only by the evolution of the productivity and technological frontier. Demand shocks could vary in intensity according to differences in the imperial might, or differences in the efficiency of the capacity of the central state to provide the right conditions to growth.²¹

Advances in Portugal, particularly in the 19th and 20th centuries, show that agricultural producers were working below the production frontier allowed by the countries shape of natural resources. In fact, the expansion of the utilization of arable land increased significantly since at least the 1860s, and the peak was reached only a century after. Moreover, the capacity to irrigate the land also increased substantially in the 20th century. These changes needed considerable amounts of investment, both private and public, and that was the true limitation. Hardly can we then argue that Portuguese agricultural expansion was limited by a “neo-Malthusian model”: instead, the major constraint was the ability to save and invest or the profitability of investments in the sector as compared to the rest of the economy, either when it was closed or when it

¹⁹ See de Vries and van der Woude (1997: 689 and 720). See also O’Brien (2000 and 2014). The British “climacteric” in the late 19th century is another case of “modern decline” (de Vries 2001: 186).

²⁰ See also Olmstead and Rhode (2009: 32-33).

²¹ For the Spain, in contrast to the Netherlands and England, see Grafe (2012).

became increasingly open.²² For most of the 19th century and the first half of the 20th, agricultural output expanded through the increase in the use of land and labour. Labour productivity increased in the century that ended in 1960 due to changes in the product mix fostered by changes in the demand pattern, as overall income growth led to higher levels of consumption of meat, dairy, fruits and vegetables, which had higher levels of factor productivity.²³

Thus, Portuguese agricultural output growth benefitted first from a large supply a land that allowed high labour/land ratios, then by changes in innovation, particularly in the product mix, which was patent in the increasing share of output of wine, then corn, and then animal products and perishables products. In the mist of these trends, there were was considerable room for the impact of changes in the use of land. Such transformations were accompanied by an increasing role of commercialization and the markets, both domestic and foreign, and this were also forces of structural change and productivity increase, as the products that reached the markets were more advanced in the chain of complexity and had higher levels of land and labour productivity. Our conclusions stem directly from the evidence that we could not identify bottlenecks for growth in Portugal across the period studied, and that when conditions were right institutions evolved, technology developed and was implemented, and public policies were applied.²⁴ Yet the development of the markets was a crucial factor as well, although it is harder to assess their contribution (Pomeranz 2000: 107). The advantage of pursuing a long term study is that we may observe institutional, technological or policy developments under different economic circumstances, providing an excellent field to observe causes and effects at work.

It is possible to reach an overall conclusion that contributes to a better knowledge of long run economic growth in Europe and eventually to new research questions. And it is important to look to the agricultural sector in particular, because of its dominant presence in economic activity until very recently, and because we need to define better what were the main changes across time and space, which can only be detected through a detailed investigation such as the one we carried here. In fact, agricultural transformations should not be seen as a universal and homogeneous process. Moreover, although Europe can be taken in its unity since the beginning of the period here study, the fact is that it is regionally very diverse and that diversity

²² See on this issue de Vries (2001: 180-182 and 190).

²³ See Branco and Silva (Chapter 7 in this book) and Lains (2009).

²⁴ See Fonseca and Reis (2011).

is a matter of utmost relevance for the study of agriculture.²⁵ The overall conclusion we have reached here regarding Portugal's agricultural history and which can be extended to other cases is that economic growth, particularly in agriculture, is most of all determined by domestic factors related to natural endowments, demographic patterns, and ability to save and invest. Globalization and the growth of the international economic relations did matter, but to a lesser extent, and its impact had to be felt only during more recent times.²⁶

Because of its size, the development of agriculture is crucial for economic growth, particularly before globalization gained momentum well into the 19th century. Agriculture was the source of food and heating for the population, as well as of inputs for construction and manufacturing and because of its sheer size overall factor productivity and income growth depended on changes within agriculture. The transformation was however a slow process conditioned on technological change, the availability of capital to invest in new crops, cattle or infrastructures. The transformations of the agricultural sector were crucial for the success of economic growth and industrialization. Southern European economies were not all the same, but there is a general pattern of lower levels of development across the century in that part of the Continent and it is very important to look at the roots of such different outcomes. The agricultural sector was certainly responsible for it but as we look closely to what happened across such a long period in Portugal, we need to question how much backwardness was a consequence of what happened in the sector, as we may observe that farmers and other relevant agents, such as governments, more often than not showed capacity to adapt to changing conditions.

Conclusion

In the span of 1,000 years studied here, the Portuguese economy was transformed from an essentially rural base, closed to the outside world, to one where services and manufacturing prevailed with borders wide open. That transformation was akin to what happened elsewhere in Europe during the same period, notwithstanding a significant number of differences. Our main conclusion is that the agricultural transformation proceeded along a pattern where continuities appear more relevant than discontinuities, where progress is more visible than backwardness, and where the speed of transformation depended more on the domestic

²⁵ See Duby (1972) and Hillbom and Svensson (2013)

²⁶ See the discussion of this in Hillbom and Svensson (2013), Timer (2013). For the impact of the empire on the Portuguese economy, see Costa, Palma and Reis (2015).

conditions than on the international environment, despite the fact that both dimensions did matter. Agriculture in Portugal thus responded to the natural environment and demographic patterns and changes were certainly not revolutionary and their impact took a long time to materialize as it happened in other parts of the continent. That interpretation leads to the conclusion that agricultural transformation in Portugal replicate to a large extent what occurred elsewhere in Western Europe, as far as our knowledge of both developments through such a long time span can tell, albeit at a distance, both in terms of timing and intensity. If this general conclusion holds, as we believe to demonstrate with the present work, than the broader conclusion that there is an overall process of European agrarian transformation, at least in the Western part of the continent, is globally reinforced, and that the international transformation was the sum of different national transformations. This conclusion goes well with the general idea that European economic history – at least on the western front - can be singled out from the global economic history, although with relevant and well identified global linkages.

The investigation into the causes of economic growth and backwardness leads necessarily to open answers, as theories, qualitative and quantitative knowledge about past economic performance are constantly changing and are rarely unanimous. As we gain better knowledge of factors of growth and economic performance, in an increasing number of regions across the world, we extend our perception on how economies function and how inputs, output, demography and the institutional framework interact, thus gaining new insights on the causes of economic development and backwardness. By going a long way back in time, far from the heyday of the British Industrial Revolution and subsequent European industrialization, and looking at other sectors besides manufacturing, we widen considerably the scope of analysis and improve the chances of better understanding why economies succeed or fail.

Portugal, a nation situated at the southwestern frontier of Europe, founded in the 12th century, with borders established in the 13th century, well open to the outside world and the seat of an empire for most of its history, and where agriculture remained as the largest sector in terms of output and employment well into the 20th century, is a most relevant case to investigate the mechanisms of economic growth and stagnation over the long-run. Due to an historiographical heritage rooted deep in the past, and supported on archival resources mostly untainted by international wars or changes in borders, that study can be carry out with a considerably degree of coherence across such a large period. There is a lot to learn about the investigation of the evolution of the agricultural sector in any European country over the long-term, as it provides a unique perspective to analyse the connections between natural resources, demographic conditions, institutional development, foreign trade, or market integration, and

economic growth. Conclusions drawn from any such national study are intimately connected to its particular features within the Continent, and thus provide further insights into the reasons behind patterns of growth and convergence or divergence across its different regions.

This study provides a long-term historical insight on the constraints and possibilities of agricultural transformation in Portugal, on the periphery of the European Continent, and provides a new interpretation on conditions for the cycles in growth of agricultural output, population, land use, and factor productivity. In agriculture is still poorly understood how the processes of change unfolded in peripheral and backward regions. Yet in order to test the validity of thesis about the basis of economic success, we need to ascertain not only why some countries succeeded, but also why some countries failed or, at least, took a long time to converge. As we approach the period where international exchanges of goods, capital and people gained an increasing role, we can easily detect the effects of those transformations in agriculture and positive responses, albeit at varying degrees of intensity. Trade with Europe and the empire led to new products, new markets, and the intensification of domestic activity, as well as to institutional adaptations, in what the role of the state and the markets was concerned. Domestic changes culminated in the 18th century but that was also the period where divergence towards the rest of Western Europe increased. The interpretation of the changes that we have detected still needs to be better integrated with the new data for trends in output and productivity in the long-run, as both sources of information are complemented. But the conclusion remains that the Portuguese agricultural sector is shaped both by elements of growth and backwardness, of progress and stagnation and that is the most important common trait that remains for the whole period covered in the present paper. Such a conclusion needs to be extended as a general interpretation for economies that lay in the periphery of more advanced areas, of areas where the technological frontier is shaped.

The Portuguese agricultural sector was hardly ever *on* the European technological frontier, was probably only rarely close to it and the distance from it varied substantially in the centuries we have covered here. Yet that did not mean that the sector was not transformed or that it was an impediment to economic change in history. Rather, if we look at periods such as the medieval *Reconquista*, the recovery from the Black Death, the response to the Renaissance globalization, the performance during the enlightened economy period, or the substantial labour and capital (but not land) productivity increases during industrialization, we may conclude after all that the sector was probably as dynamic and adaptive as its ecological and geographical limitations allowed. European economic history is about diversity of paths of development and the agricultural sector in Portugal certainly did not fail.

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Table 9.1 – Growth of agricultural output, 1300-1800 (annual rates; percent)

England (1)			Holland (2)		Italy (Centre & North) (3)		Spain (4)		Portugal (5)	
	Total	Arable								
1300-1400	-0.44	-0.60	1512-1565	0.37	1360-1430	0.16	1500-1600	0.06	1500-1600	0.03
1400-1470	-0.16	-0.37	1565-1620	0.86	1430-1600	-0.24	1600-1700	0.21	1600-1700	0.06
1470-1600	0.28	0.44	1620-1665	-0.02	1600-1760	0.11	1700-1790	0.32	1800-1840	0.12
1600-1700	0.27	0.29	1665-1720	-0.11	1760-1855	-0.17	1700-1750	0.56	1700-1750	0.52
1700-1800	0.74	0.41	1720-1800	0.28			1750-1790	0.03	1750-1800	-0.13

Sources: Broadberry et al. (2015: Table 3.16), van Zanden and van Leeuwen (2012: Table 4), Malanima (2010: Table 4), Álvarez et al. (2016: Table A-3. column 1) and Reis (Chapter 6 in this book: Statistical Appendix).

(1) Rates calculated on decadal averages starting in the years shown; “Total” includes the arable and the livestock sectors. (2) Rates calculated on 5-years averages centred in the years shown. (3) Rates calculated in the source with a Hodrick-Prescott trend. (4) Based on the index of output per head estimated through tithes (upper bound); rates calculated on decadal averages starting in the years shown. (5) Rates calculated from decadal averages starting in the years shown.

Table 9.2 - Growth of agricultural output, population and output per capita
in Europe, 1300-1800

	England	Netherlands	Belgium	Germany	Poland	Austria	France	Italy	Spain	Portugal	Europe (1)
A - Agricultural output growth (annual growth rates; percent)											
1300-1400	-0.58							-0.15			
1400-1500	0.08		0.16	0.29	0.27	0.10	0.48	0.13	0.21		0.21
1500-1600	0.21	0.30	-0.02	-0.13	-0.05	-0.33	-0.12	0.31	-0.06	0.01	0.02
1600-1700	0.37	0.23	-0.02	-0.09	0.30	0.30	0.12	-0.05	0.13	-0.01	0.11
1700-1800	0.33	0.25	0.52	0.65	0.42	0.39	0.29	-0.06	0.20	0.20	0.30
1700-1750	0.47	0.38	0.81	0.40	0.17	0.60	0.29	-0.01	-0.01	0.67	0.37
1750-1800	0.19	0.12	0.22	0.90	0.68	0.18	0.29	-0.11	0.41	-0.28	0.23
B - Population growth (annual growth rates; percent) (2)											
1300-1400	-0.69							-0.29			
1400-1500	0.00		0.22	0.43	0.40	0.21	0.33	0.19	0.21		0.18
1500-1600	0.56	0.48	0.17	0.14	0.20	0.19	0.13	0.31	0.15	0.62	0.31
1600-1700	0.18	0.23	0.14	0.05	0.19	0.13	0.15	0.00	-0.01	0.32	0.13
1700-1800	0.55	0.12	0.58	0.51	0.39	0.42	0.26	0.31	0.42	0.24	0.38
1700-1750	0.31	-0.01	0.62	0.4	0.30	0.31	0.23	0.32	0.28	0.19	0.29
1750-1800	0.79	0.24	0.55	0.62	0.48	0.53	0.29	0.29	0.57	0.29	0.46
C - Agricultural output per capita growth (annual growth rates; percent)											
1300-1400	0.10							0.13			
1400-1500	0.08		-0.06	-0.14	-0.13	-0.11	0.14	-0.06	0.00		0.03
1500-1600	-0.36	-0.17	-0.18	-0.27	-0.25	-0.52	-0.25	0.00	-0.21	-0.62	-0.30
1600-1700	0.19	0.00	-0.16	-0.14	0.11	0.17	-0.03	-0.05	0.14	-0.33	-0.02
1700-1800	-0.22	0.13	-0.07	0.14	0.04	-0.03	0.03	-0.37	-0.22	-0.04	-0.07
1700-1750	0.16	0.39	0.20	0.00	-0.13	0.29	0.06	-0.33	-0.29	0.48	0.08
1750-1800	-0.60	-0.12	-0.33	0.27	0.20	-0.35	0.00	-0.40	-0.16	-0.57	-0.23

Sources and notes: Computed from Allen (2000: Tables 6 and 7) and Reis (Chapter 6 in this volume: Statistical Appendix), for Portugal. For all countries except Portugal, values computed from indices with the base England in 1500=100; for Portugal the dates are the centre of 5-year averages, except for 1500, which is average for 1500-1502; For Portugal, consumption per capita. (1) Simple average of all indices. (2) Rates computed as difference between Section A and C.

Table 9.3 - Growth of agricultural output in Europe, 1870-1938
(annual growth rates; percent)

	1870-1913	1913-1920	1920-1938	1870-1938
Austria	1.44	-3.55	2.06	1.09
Hungary	2.72	-1.90	0.88	1.79
Belgium	0.70	-0.57	1.60	0.61
Denmark	1.62	-0.60	3.46	1.93
France	0.62	-0.66	1.13	0.69
Germany	1.56	-4.32	3.11	0.91
Greece	2.12	-5.90	4.27	1.53
Italy	0.86	-0.27	0.29	0.82
Netherlands	0.86	1.69	1.96	0.68
Portugal	1.19	-1.56	3.83	0.86
Spain	0.76	1.41	0.77	0.97
Sweden	1.62	-2.64	3.01	1.14
UK	0.00	-0.74	1.87	0.26
Western Europe ¹	0.96	-2.09	1.08	0.75
Southern Europe ²	0.87	0.19	0.76	0.89

¹ UK, France, Sweden, Denmark, Belgium, Netherlands, Germany and Finland.

² Italy, Greece, Spain and Portugal.

Source: Lains (2003: 49). See also Federico (2005: Tables 3.1 and 3.3)